

NASA Success Story

ChemScan Process Analyzer



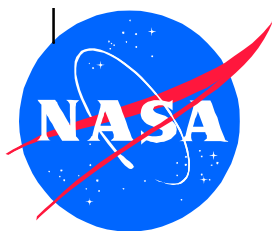
A Wisconsin company is successfully commercializing water analyzers originally designed under a Small Business Innovation Research (SBIR) contract sponsored by NASA at Kennedy Space Center. Applied Spectrometry Associates (ASA), Inc. of Waukesha is offering four models of its ChemScan(r) Process Analyzers. Over 100 ChemScan systems have been installed at industrial and municipal facilities, including multiple parameter systems at major cities like Austin, Texas; Calgary and Edmonton, Alberta, Canada; Gainesville, Orlando and Tampa, Florida; Las Vegas, Nevada; Los Angeles; New York City, Phoenix, Arizona; and Seoul, South Korea. ASA bought the manufacturing rights from Biotronics Technologies, Inc., also of Waukesha. Biotronics worked with the KSC Biomedical Office under the SBIR contract to develop the analyzer. NASA originally needed the innovation for monitoring hydroponic plant nutrients in the Bioregenerative Life Support System (BLSS) program. Commercially, ChemScan Process Analyzers are used to measure multiple chemicals at municipal drinking water treatment plants and municipal wastewater treatment plants or in industrial water chemistry processes. Typical applications for process analyzers are characterized by large flow volumes, a dynamic chemical matrix, and a substantial motive to obtain real-time chemical analysis information. In 1998 ASA added a new model to its product line, the ChemScan UV-2150 Process Analyzer, offering improved reliability and reduced operation and maintenance cost for automatic analysis of ammonia or phosphate in water. This model contains many of the features of earlier versions, including the use of multiple wavelength ultraviolet-visible light absorbance for analysis. This makes it possible to eliminate sample conditioning steps and to simplify sample reagent additions that would otherwise be required. Operating and maintenance costs are greatly reduced with these products, without sacrificing accuracy or reliability.

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ChemScan Process Analyzer (Continued)

NASA Involvement The KSC Biomedical Office desired a water chemistry analyzer to provide on-line, real-time monitoring of plant nutrients in hydroponic solutions and the biomass processing reactors in the Bioregenerative Life Support System (BLSS) program. The instrument was to be capable of detecting, identifying, and quantifying the macro nutrients (P, K, Ca and Mg) absorption spectra. The NASA Advanced Life Support (ALS) program has been working on bioregenerative life support for future long duration space flights and permanent bases in space. When humans establish permanent bases on the Lunar surface or travel to Mars for exploration, they will need food, water and air. For long term missions it will not be economically feasible to resupply these life support elements from Earth. Humans will need to develop systems to produce food, purify their water supply, and create oxygen from the carbon dioxide they expel based on plant production systems.

Social/Economic Benefit The ChemScan analyzers can be applied to various municipal water and industrial processing plants, saving money due to low maintenance times and on-line monitoring, at either in-plant or remote locations. ChemScan analyzers require only a few hours each month for maintenance, including the time required for preparation of reagents. Very little time is required for calibration verification or adjustment, and no time is required for recalibration. Customers who have used ChemScan report that the analyzer requires less maintenance than any other chemical analyzer in their facility. Reliability is the most important attribute for a process analyzer, particularly if the output from the analyzer is going to be used as data for operation or adjustment of a treatment process. If the analyzer fails or produces inaccurate results, the process will be uncontrolled. All ChemScan analyzers and sample analysis systems are designed to provide reliable operation, even in extreme operating environments. ChemScan can detect any chemical substance that absorbs light in the ultraviolet or visible wavelength range. Ions of nutrients, ions of heavy metals that form coordination compounds in water, unsaturated (double bonded or triple bonded) hydrocarbons and aromatics are usually good candidates for analysis using ultraviolet or visible spectrometry. Chemicals that possess natural absorbance characteristics can be detected directly using primary absorbance techniques. Chemicals that do not possess natural absorbance require the assistance of a reagent for indirect detection using secondary analysis techniques. ChemScan has developed many primary and secondary analysis methods that take advantage of the multiple wavelength detection capability to simplify the analysis. ChemScan can also perform multiple primary and secondary analyses of a sample.

Industry Partner

Applied Spectrometry Associates, Inc.

NASA Partner

Kennedy Space Center

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